



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER OF PATENTS AND TRADEMARKS
Washington, D.C. 20231
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/818,666	03/27/2001	H. Jim Fulford	2000.045900/TDM	2445

23720 7590 04/23/2003

WILLIAMS, MORGAN & AMERSON, P.C.
10333 RICHMOND, SUITE 1100
HOUSTON, TX 77042

EXAMINER

TRAN, BINH X

ART UNIT	PAPER NUMBER
----------	--------------

1765

7

DATE MAILED: 04/23/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

ito

Office Action Summary

Application No.

09/818,666

Applicant(s)

FULFORD ET AL.

Examiner

Binh X Tran

Art Unit

1765

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10 February 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-35 is/are pending in the application.
- 4a) Of the above claim(s) 33-35 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-32 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☒ Claim(s) 1-35 are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

Election/Restrictions

1. Applicant's election with traverse of Group I (claim 1-32) in Paper No. 6 is acknowledged. The traversal is on the ground(s) that how process as claimed can be practiced using a system without a controller [as suggested by the examiner] could be operational. This is not found persuasive because there is no limitation in the process as claimed that required a controller. One skill in the art does not necessarily need a controller in order to comparing the first depth to a desired depth. Human operator of the apparatus can perform the step of comparing the first depth to the desired depth.

The requirement is still deemed proper and is therefore made FINAL.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bukhman et al. (US 5,795,493) in view of Bollinger (US 5,375,064)

Bukhman teaches a method comprising:

forming a process layer above a semiconductor substrate;

etching at least a portion of the process layer (col. 6 lines 40-67, col. 8 lines 34-

38);

measuring a thickness of the device wafer at a plurality of location (col. 8 lines 38-40, read on "measuring a first depth of the etch in a first preselected region of the semiconducting substrate");

heating the plurality of portions to a temperature determined by heating profile map and repeating the etching, heating step until the wafer has a predetermined thickness (Note: the term "predetermined thickness" is the same with "desired depth" col. 8 lines 40-50, read on "varying the temperature of a subsequently processed semiconducting substrate in a region corresponding to the first preselected region in response to the first depth being different from the desired depth").

Bukhman does not explicitly disclose the step of comparing the first depth to the desired depth. In a semiconductor method, Bollinger disclose the comparison step (34) to compare the measured thickness profile (i.e. first depth) with a predetermined or desired thickness (i.e. desired depth) (col. 4 lines 45-60, Fig 3). It would have been obvious to one having ordinary skill in the art, at the time of invention, to modify Bukhman in view of Bollinger by comparing the first depth to a desired depth because it help us to determine whether we should stop or continue with the etching process.

Respect to claims 2, Bukhman discloses measuring a thickness of the device wafer at a plurality of location (col. 8 lines 38-40, read on "second location"). The steps of comparing the depth to a desired depth as well as varying the temperature of the subsequently process have been discussed in previous paragraphs.

Respect to claim 3, Bukhman clearly teaches measuring the thickness of the wafer at a plurality of portion (including the second depth) and etching the wafer to the

Art Unit: 1765

predetermined thickness. Since "predetermined thickness" (i.e., desired thickness) can be any thickness value, it would have been obvious to one having ordinary skill in the art, at the time of invention, to pick the second depth as the desired thickness. The limitations of claims 13 and 23 have been discussed above.

Respect to claims 4-5, 14-15 and 24-25 Bukhman teaches an increase in temperature results in proportional increases in etch rate (col. 4 lines 48-55). The examiner will interpret that Bukhman also implicitly teaches that a decrease in temperature results in proportional decreases in etch rate. Therefore it would be obvious to one skill in the art to increase (or raise) the temperature of the subsequently process if the second depth is less than the desire depth. It is also equally obvious to one skill in the art to decrease the temperature of the subsequently process if the second depth is greater than the desire depth since temperature is a result effective variable.

Respect to claims 6, 16 and 26, Bukhman teaches that the process layer is a polysilicon above the semiconductor substrate (col. 2 lines 42-50). Respect to claim 7, 17 and 27 Bukhman teaches performing a plasma etching process on the layer (col. 3 lines 24-52). Respect to claims 8, 18 and 28 the step of varying the temperature of the subsequently process has been discussed in previous paragraphs.

Respect to claim 9-12, 19-22, 29-32, Bukhman teaches to measure the depth of a plurality of locations (col. 8 lines 26-50). It is known both in math and statistics that the average, the median, the minimum, the maximum must exist and can be calculated if a plurality of data point is known (i.e., the plurality of measured depths is known). It

Art Unit: 1765

would have been obvious to one having ordinary skill in the art, at the time of invention, to use the average, the medium, the minimum or the maximum as the first depth because it can be easily calculated.

Response to Arguments

4. Applicant's arguments filed 2-10-2003 have been fully considered but they are not persuasive. The applicant argues that Bukhman "fails to teach or suggest to compare the first depth to the desired depth of a substrate and to vary the temperature of the subsequently processed semiconducting substrate in a region corresponding to a first preselected region in response to the first depth being different from the desired depth". First, the examiner never said that Bakhman teaches the step of comparing the first depth to the desired depth. Bollinger teaches the step of comparing the first depth to the desired depth. However, Bukhman clearly teaches that the thickness profile (i.e., the depth) and the temperature depend on each other. Since the temperature and the depth depend on each other. One skill in the art would understand that a change in the temperature would result in a change in the depth. Therefore if the etching depth is not equal to the desired depth, it would be obvious to change the temperature in order to achieve to the proper depth.

The applicants also argue that Bollinger does not teach the step of varying the temperature of the subsequently processed substrate in response to the thickness profile of the substrate matching a desired profile of the substrate. Again, the examiner agrees that Bollinger does not teach this step. However, Bukhman clearly disclose this step. It would be obvious to comparing the depth (as suggest by Bollinger) and

changing the temperature of the subsequently process to achieve the proper depth (as suggest by Bukhman). The examiner, therefore, maintains that claims 1-32 are unpatentable in view of Bukhman and Bollinger.

Conclusion

5. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Binh X Tran whose telephone number is (703) 308-1867. The examiner can normally be reached on Monday-Thursday and every other Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Benjamin L Utech can be reached on (703) 308-3836. The fax phone numbers for the organization where this application or proceeding is assigned are (703)

Application/Control Number: 09/818,666

Page 7

Art Unit: 1765

872-9310 for regular communications and (703) 872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

Binh X. Tran
April 19, 2003


BENJAMIN L. UTECH
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1700